




National Science Foundation • Office of Inspector General
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ALERT MEMORANDUM

DATE: September 15, 2015

TO: Ms. Martha A. Rubenstein
Office Head and Chief Financial Officer
Office of Budget, Finance, and Award Management

FROM: Dr. Brett M. Baker 
Assistant Inspector General for Audit

SUBJECT: NSF's Management of Potential \$80 Million Cost Overrun for NEON,
Report # 15-3-001

The National Ecological Observatory Network (NEON) is a \$433.8 million project, which was to be constructed over a five-year period from August 2011 through July 2016. In June 2015, NEON management notified NSF that the project was facing a potential cost overrun of \$80 million. It is noteworthy that NSF was originally informed by NEON that the cost overrun would be \$27 million. In response to questions from NSF, NEON increased that estimate to \$40 million, then to \$60 million, and finally to \$80 million.

NSF did not become aware of the \$80 million potential budget overrun until notified by NEON. Monthly Earned Value Management (EVM) data provided to NSF by NEON indicated that the project was not progressing appropriately, which precipitated NSF's request for detailed estimates of the cost to complete construction. Certain factors that could have contributed to increased project costs, such as permitting delays and environmental requirements, may have been outside of NSF's control. However, since 2011 OIG has recommended that NSF address serious financial risks in the NEON project.

We examined the factors contributing to the potential cost overrun.¹ As required by NSF, due to the potential cost overrun, NEON will de-scope the project, which includes decreasing the number of sites from 106 to 82 (removal of relocatable and experimental sites) decreasing instrumentation and removing an experimental component of the project. As a result, taxpayers will not receive all the promised scientific benefits of the project.

¹ This inspection was conducted in accordance with the Quality Standards for Inspection and Evaluation. Inspection steps included interviewing NSF staff, reviewing previous audit reports, and reviewing NSF documents. (TeamMate #15-A-2-002)

NEON has also informed NSF that it can save \$12.9 million by instituting corporate and management efficiencies and can save \$13.3 million by “transitioning” funds from construction to operations at an accelerated rate. Although NEON plans to take steps to address the potential \$80 million overrun, there is no certainty that the overrun will not increase.

NEON project risks originated with the construction budget, which included \$154 million (nearly 36 percent of the total proposed budget) in questioned and unsupported costs, as identified by OIG audits. As the project has progressed, additional serious financial management problems have surfaced. For example:

- An August 2015 independent, external assessment commissioned by NSF of NEON’s cost estimate to complete the project gave the estimate an overall rating of “inadequate.” In 2013, during the indirect cost rate negotiation of fiscal year 2011, NSF found potential questionable spending by NEON for meals, visa, and entertainment activities, among other things. In the same year, the indirect cost rate negotiation of fiscal year 2012 disclosed the potential of lobbying activities.
- During our interviews in August 2015, NSF had not yet determined whether NEON had spent any of the \$35 million in contingency funds without NSF approval.

This memo is a summary of the serious accountability concerns associated with NEON that have contributed to the potential cost overrun and the de-scoping of the project, which will decrease the scientific capability of the project. It is imperative that NSF take strong and immediate action to address OIG recommendations and to ensure robust oversight of the NEON project as it proceeds.

Significant Problems With the Cost Proposal for NEON Warranted NSF’s Enhanced Monitoring of Expenditures, Which Did Not Occur

As noted earlier, beginning in 2011, auditors identified serious flaws in NEON’s proposed construction budget. Auditors issued three inadequacy memos over a four month period in 2011 and issued an adverse opinion on the proposed budget in 2012 because the proposal did not form an acceptable basis for negotiation of a fair and reasonable price. The proposal included \$154 million in questioned and unsupported costs (36 percent of the total budget). None of the proposed cost elements for labor, overhead, equipment, and other costs reconciled to the supporting data in the proposed budget.

In light of the concerns about the NEON cost proposal, NSF should have increased its oversight of costs as the project progressed. Instead, once the project was underway NSF did not require adequate evidence that project expenditures were warranted, reasonable, or allowable under NSF and federal requirements. The NSF OIG has recommended in past audits that NSF require large facilities to submit annual incurred cost submissions and undergo annual incurred costs audits.²

² Incurred cost submissions, which we have recommended for nearly three years for large cooperative agreements, are important for proper cost monitoring because they provide visibility over claimed costs since they include certified schedules of direct costs and applied indirect expenses. Absent incurred cost submission, NSF cannot adequately monitor expenditure of funds, which heightens the risk that unallowable costs could be charged and go undetected.

NSF's own staff also recommended NSF "pursue an incurred cost audit (direct and indirect costs) for fiscal year 2014...."

However, NSF has not required an incurred cost submission from NEON, nor has it conducted an incurred cost audit of NEON. If NSF had taken either action, NSF could have been able to identify unallowable or poor spending by NEON.

The need for enhanced oversight of NEON spending was further demonstrated by concerns identified by NSF's Cost Analysis and Audit Resolution (CAAR) Branch group. That group's internal reports indicated questionable spending by NEON, which may span multiple awards to NEON including planning and construction. NSF informed us that it was concerned about an increasing amount of indirect costs for NEON in FY 2014 and that CAAR conducted an indirect cost rate review, which also identified concerns.

During indirect cost rate negotiations, NSF reviewed a loss of nearly \$500,000 that occurred because NEON moved to a larger building and was unable to find a tenant to lease all of the space it vacated. NSF concluded that a portion of the \$500,000 was unallowable. NSF also stated that during the indirect rate negotiation, it was concerned about \$257,606 NEON spent for lobbying. This matter was referred to the grants specialist for review, who stated that the information NEON supplied to support the \$257,606 in costs was "unclear." NSF is still looking into whether these costs are allowable. NEON also spent over \$100,000 for library subscriptions. The program officer and grants officer reviewed this expense and concluded that it was necessary and reasonable for the award.³

NSF informed us that it reviewed the salaries of NEON's top ten executives and found that one of those annual salaries was nearly \$300,000, and an additional four were more than \$200,000 each. NSF stated that it was concerned about whether those salaries were justified and whether NSF could sustain these salaries in the future. Staff who negotiated the indirect cost rate also stated that NSF disallowed costs NEON submitted for picnics and holiday parties.

Other NSF internal reports identified the potential for shifting of funding between operations and construction awards. Awardees may do this to avoid revealing a cost overrun. NSF stated that to determine whether this is occurring, it has started to request monthly expenditure reports from NEON. NSF had concerns about these and other costs, including costs related to liability insurance for the CEO, travel, training, and legal fees, which it informed us that it is looking at (and in some instances has already examined) in greater depth.

NSF did not start requiring NEON to provide more detail about its spending until May 2015, and NSF has just recently started reviewing transaction level detail associated with expenditures that appeared unusual. Obtaining and reviewing transaction level data throughout the life of the project could have revealed unallowable or unreasonable expenditures, or funds spent for awards other than those for which they were provided. Incurred cost submissions and visibility over expenditures, including contingency spending, as OIG has recommended, are critical components of cost surveillance.

³ The NSF OIG did not determine which NEON award these questionable expenditures related to. However, these examples provide concern over NEON's expenditures.

Finally, the NEON construction award requires NSF approval before using contingency funds; however, NEON has been executing against a revised project plan that incorporated \$35 million of budget contingency into the performance measurement baseline without prior NSF approval. To date, NSF has not determined whether NEON actually spent any of the \$35 million in contingency. If, as OIG recommended, NSF held contingency funds until NEON provided sufficient support for their use, the NSF would have greater visibility over contingency expenditures and assurance that the funds were not spent in advance of NSF approval.

NEON's First Cost Estimate to Complete the Project Was Found to be Inadequate

NSF documentation indicated that NSF staff was concerned with slippages in NEON's schedule beginning in January 2013. Based on those concerns, NSF requested that NEON submit a cost estimate for project completion. NSF received this cost estimate in August 2014, and in May 2015 NSF commissioned Booz Allen Hamilton to assess the sufficiency of this estimate.⁴

That report, which was provided to NSF in August 2015, resulted in an overall inadequate rating for the cost estimate. The report stated that the estimate was not sufficient to support NEON's or NSF's financial reporting requirements. Further, Booz Allen was unable to assess NEON's work efficiencies or to determine how \$19 million was distributed against the work breakdown structure elements. Following are highlights of the serious deficiencies in NEON's cost estimate for project completion identified by the Booz Hamilton report.

- The cost estimate did not provide the level of detail commensurate for the construction phase of the project.
- There was frequent turnover in key staff involved in developing the estimate.
- The estimating plan was not sufficiently detailed to support the estimating process.
- Tools central to project controls were not functioning as described.
- There was no clear evidence that true cost drivers had been identified.
- The reported summary level figures did not consistently trace to support documentation.
- Cost estimating assumptions were not supported by assessment of risk for failure of each assumption.

Finally, the assessment of NEON's data used to support its estimate disclosed such "widespread data quality issues" and challenges found after reviewing an initial set of samples, that NSF requested that Booz Allen discontinue its detailed assessment. However, Booz Allen presented its results based off of limited analysis and sampling. The extensive flaws identified by Booz Allen raise serious questions about the reliability NEON's estimate of the overrun and of the validity of the actions it proposes to take to address the overrun, such as the \$13 million savings NEON stated it can achieve through "corporate and management efficiencies."

⁴ Booz Allen Hamilton applied a qualitative review framework with evaluation areas based primarily on the *GAO Cost Estimating and Assessment Guide* and *NSF Large Facilities Manual*.

NSF Needs to Ensure Second Cost Estimate to Complete Construction Will Be Independently Assessed and Appropriate Corrective Action is Taken

In light of the serious deficiencies identified with the first estimate of costs to complete, NSF is requiring NEON to submit a revised cost estimate to complete construction by December 2015 incorporating the de-scoping required by NSF and a new estimate to complete the project. The deficiencies in NEON's construction budget and in its first estimate for project completion raise serious questions about the value of another estimate prepared by NEON.

Despite this concern, NSF informed OIG during fieldwork that it did not plan to have the second estimate independently assessed. Instead, the Large Facility Office, grants office, and program staff were planning to review the estimate and "use their judgment" about whether the estimate was sufficient. In its September 11 response to our draft report, which discussed the need for an independent cost assessment, NSF informed us that it does plan to contract for an assessment. In light of the serious flaws independent reviewers identified in both the NEON proposal and the first estimate to complete, it is essential that the second estimate be rigorously evaluated and that swift and robust actions are taken to address any flaws found with the estimate before it is accepted.

NEON Project Reports to NSF Lack Sufficient, Reliable Information for NSF to Manage the Project

In addition to problems with oversight of project expenditures, the Earned Value Management (EVM) reports provided by NEON did not give accurate figures for the cost to complete until prompted by NSF based on declining scheduled variance. Based on NEON's EVM and monthly progress reports, NSF was unable to identify the magnitude of the potential budget overrun or the precise reason for the schedule variance.

When NSF requested that NEON provide more accurate documentation to support the variance, NSF stated that NEON was unresponsive or that the documentation provided was insufficient. In May 2015, NSF informed NEON that it was not providing an adequate explanation of variances in its monthly EVM reports and had not provided mitigation plans to address those variances, as required by the terms of the Cooperative Support Agreement. NSF stated delays resulted in employees being paid while NEON waited for permits and parts. However, according to NSF they were performing other appropriate tasks related to project construction.

As previously noted, NSF was not aware of the full extent of the problems until its June 2015 site visit when NEON informed NSF of the increasing potential cost overrun. According to NSF the potential \$80 million figure is NEONs "best estimate." Therefore, there is no firm estimate of what it will cost to complete construction or what the final potential budget overrun will be.

Conclusion

The NEON project is plagued with problems. NEON is not yet able to provide NSF the accurate information it needs to monitor the project's progress and NSF does not yet have accurate information about how much it will cost to complete the project. Without this information, NSF cannot accurately identify the extent of the cost overrun and develop an adequate plan to address it.

At the time of our work, NSF had awarded \$273 million of the estimated \$433 million of total project funding for NEON. It is not too late for NSF to strengthen its oversight of NEON expenditures and to dedicate the resources necessary to ensure that funds are being spent properly.

NSF applies its highest level of attention and scrutiny to determine the scientific merit of the projects it decides to fund. It is imperative that NSF apply the same rigorous attention and scrutiny to its financial management and oversight of its large facility projects. As evidenced by the financial risks in NEON, the stakes are too high for NSF to continue business as usual. The research community and the American taxpayers deserve better.

Recommendation

We recommend that the NSF Chief Financial Officer take immediate and strong steps to ensure that it has the financial and project information it needs to oversee the NEON project. Such steps could include:

- Special payment treatment of the project in which NSF requires NEON to provide detailed invoices before payment is made;
- More substantial NSF involvement in NEON management;
- An independent assessment of the December 2015 cost estimate to complete and evidence that swift and robust corrective action is taken;
- A requirement that NEON provide EVM reports with sufficient quality and with sufficient detail to manage the project's progress and cost.

Agency Response and OIG Comments

In response to our draft, NSF indicated that it did not agree with many of the specific assertions made in the memorandum and with our conclusion that the lack of cost monitoring controls was a major contributor to the potential cost overrun. We disagree. If NSF had strong cost surveillance practices in place from the start of the project, it would have had the information it needed to identify the potential cost overruns early on, and would thus have been able to address them before they amounted to tens of millions of dollars.

NSF's response indicated that, in general, it agreed with the spirit of our recommendations. We have included NSF's response to this report in its entirety as an Appendix.

We have concerns with the sufficiency of NSF's proposed actions in response to all of our recommendations. In particular we are concerned by the actions it proposes to take in response to our recommendations that it obtain an independent assessment of the second cost estimate to complete, and that it subject the NEON project to special payment treatment. With respect to the first, while we are pleased the NSF recognizes the importance of obtaining an independent review, it is critical that the review be rigorous and objective and that swift and robust action be taken to address its findings and recommendations. It is not clear what type of review NSF will obtain, how in depth that review will be, nor how or when NSF will respond to any findings and recommendations that result from that review.

With respect to the second action, NSF's response indicates that it is taking our recommendation that it give the NEON project special payment status "into consideration." NSF appears to believe its decision to conduct monthly expenditure reviews is sufficient to meet the intent of our recommendation. NSF began conducting these reviews in May 2015. While such reviews provide the agency with more information than NSF previously had about project costs, they do not provide as much as would be required if NEON was in special payment status and thus do not provide the same level of protection as special payment status does. In particular they do not require the provision of invoices in advance of reimbursement.

In light of the serious problems that have plagued the NEON project, we stand by our recommendations.

In accordance with Office of Management and Budget Circular A-50, Audit Followup, please provide a written corrective action plan within 60 days to address the report recommendations. This corrective action plan should detail specific actions and milestone dates.

If you have any questions about this alert memo, please contact Dr. Brett M. Baker, Assistant Inspector General for Audit, at 703/292-7100, or email at bmbaker@nsf.gov.

cc: Christina Sarris
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Appendix: Full Agency Response



National Science Foundation

4201 Wilson Boulevard, Arlington, Virginia 22230

Memorandum

DATE: September 11, 2015

FROM: *Karen Ripleady*
Ms. Martha A. Rubenstein
Office Head and Chief Financial Officer
Office of Budget, Finance, and Award Management

TO: Dr. Brett M. Baker
Assistant Inspector General for Audit
Office of Inspector General

SUBJECT: Response to "NSF OIG Alert Memorandum, Dated August 31, 2015, NSF's Management of Potential \$80 Million Cost Overrun for NEON"

Thank you for allowing NSF the opportunity to provide comments on the subject draft Memorandum. Prior to receipt of the Alert Memo, NSF had identified the potential for a cost overrun under the National Ecological Observatory Network (NEON) project, and has taken strong action to address the issue, as briefly outlined in this Memorandum. Actions already initiated by NSF closely align to the OIG recommendations. These actions include the requirement for monthly cost expenditure reports to confirm that incurred costs are reasonable and aligned with project execution requirements, substantial involvement by NSF in oversight of NEON project execution, and a specific plan of action to ensure increased quality of Earned Value Management (EVM) reporting under the project. Additionally, based on our most recent assessment of cost risk for the project and subject to NEON's submission of revised project documentation, NSF plans to contract for an independent assessment of the December 2015 cost estimate to complete construction of the NEON project.

Background

As you are aware, NEON is a continental-scale observation system for examining ecological change over time. The NEON construction project began in 2011 with a projected duration of six fiscal years and an estimated cost of \$433.8 million. NSF began to have concerns with the project as early as January 2013. We noticed increased schedule slippages associated with production and procurement as well as the plan for the cyberinfrastructure, lack of data product development, delayed engineering designs for sensor assemblies, and lack of integration across teams. Consequently, NSF required NEON Inc. to provide their proposed corrective actions over the ensuing months. We have had continual, close engagement with NEON Inc. throughout this process. The project cost and schedule was re-planned in August 2014, and all information presented by NEON, Inc. at that time indicated that the scope could still be completed within the approved budget. However, even more rapid schedule slippages became evident at the start of this year, which prompted NSF to further increase its oversight of the project.

In late 2014, NSF also implemented a project-specific oversight team using an agency-wide approach known as the Integrated Project Team (IPT). The NEON IPT has continued to regularly monitor schedule and costs under the NEON project, and when necessary improvements were not evident called an ITP meeting in April 2015 to discuss the need for additional corrective actions. A warning letter was issued by NSF in May 2015 regarding the project's lack of compliance with NSF reporting and project management requirements and a companion letter was issued indicating that NSF would be working to assist NEON in rectifying the identified issues. A series of site visits coupled with a cost sufficiency review held in mid-

June 2015 enabled NSF to obtain a more transparent estimate from NEON Inc. of the potential cost overruns and the extent of the projected schedule slip. These estimated costs revealed the full extent of the problem and the need for NSF to take de-scoping actions.

NSF convened a scope management analysis meeting for NEON at NSF headquarters on July 14-17, 2015. The participants included members of the NSF staff from the NEON Program, NEON, Inc. project staff, members of the NEON Board of Directors and Science Technology Education Committee (STEAC), and domain scientific experts from the community involved in the original design. The scientific community has accepted the necessity of scope changes that have been identified as a result of this meeting, and has expressed continued enthusiasm and support for the project. Indeed, the Ecological Society of America past and present presidents recently published a letter in Science expressing their enthusiastic support of the ongoing project.

NSF takes its responsibility for stewardship of taxpayer resources extremely seriously, and strong oversight of our large facilities is a top priority. That is why since FY 2009 projects funded through the MREFC account have been subject to NSF's "no cost overrun" policy.

NSF Cost Oversight of NEON Construction

The Alert Memorandum indicates that since 2011 the OIG has recommended that NSF address serious financial risks in the NEON project, including inadequacies in the construction budget for the project and the failure to obtain incurred cost information under the award. NSF disagrees with many of the specific assertions made in the Memorandum and the conclusion that the lack of cost monitoring controls is a major contributor to the potential cost overrun. To strengthen oversight and controls of large facilities construction projects, NSF has undertaken several important initiatives over the past year. These initiatives provided strengthened procedures, including standardized monthly reporting requirements including the use of contingency, requirements for increased analysis of pre-award cost estimates, the submission of incurred cost information, and the conduct of incurred cost audits at the completion of the construction phase of the project, or earlier when warranted based on risk analysis.

As noted in the OIG Alert Memorandum, NEON was identified as needing an incurred cost audit based on the risk assessment that had been conducted by the agency, which is planned for initiation after completion of the intensive near term activities necessary to ensure the receipt of adequate revised budget and technical information from NEON Inc. by December 1, 2015. We also note that NSF has already identified and disallowed costs through existing agency baseline and advanced award monitoring procedures, substantial involvement by NSF program personnel, and other activities undertaken in accordance with the terms of the Cooperative Agreement.

NSF oversight activities currently continue with review of NEON Inc.'s annual financial statement audit, indirect cost rate reviews, periodic payment testing/review, and targeted internal reviews of the revised performance baseline, contingency estimate, and project management documentation. Since 2011 to date, approximately \$118,000 in unallowable direct and indirect costs have been identified under the NEON award based on regular cost oversight activities conducted by the agency. Additional potential questioned costs totaling \$473,783 supporting NEON Inc.'s Office of External Affairs are currently pending resolution by the agency.

Responses to OIG Recommendations to ensure that NSF has the financial and project information it needs to oversee the NEON project:

NSF agrees with the spirit of the OIG recommendations and has implemented all necessary and relevant actions prior to receiving the Alert Memo. Agency actions already underway which also address the OIG recommendations are described below.

1. **Special payments treatment in which NSF requires NEON to provide detailed invoices before payment is made.**

BFA Response: NSF is conducting monthly expenditure reviews, and has strictly limited the amounts of funding made available to NEON Inc. In addition, we will take into consideration NSF's special payment policies and procedures and modify our existing activities as warranted.

2. **More substantial NSF involvement in NEON management.**

BFA Response: NSF has increased its involvement in the management of the NEON project as evidenced by increasing technical oversight, cost monitoring, assistive visits, and review of project documentation. As issues have arisen there has been a corresponding escalation of management involvement.

3. **Independent assessment of the December 2015 cost estimate to complete.**

BFA Response: NSF plans to contract for an independent assessment of the December 2015 cost estimate to complete construction of the NEON project, subject to NEON's submission of revised project documentation.

4. **Obtain EVM reports with sufficient quality and with sufficient detail to manage the project's progress and cost.**

BFA Response: NEON Inc.'s Earned Value Management System has been problematic with regard to the efficiency and reliability of showing trends in performance. Insisting on compliance with the new standardized monthly reporting requirements has helped to illustrate this weakness compared to other projects. This is one of the many components that are covered by our review of project documentation that is required to meet NSF's standards by December 1, 2015. As described in NSF's Scope Management Letter to NEON Inc. dated July 31, 2015, NEON Inc.'s ability to provide these deliverables and effectively evaluate and respond to trends in performance within the timeframe required and at a level of clarity and detail acceptable to NSF will have a direct impact on future decisions concerning continued funding of the NEON project. Improved EVM data from NEON will feed into the trend analysis done by NSF.